AMENDMENTS TO THE CLAIMS

Please amend the claims as follows:

1-20. (Canceled)

21. (New) An apparatus for oscillating a surface, the apparatus comprising an oscillator circuit having:

a) a piezoelectric crystal connected to the surface;

b) a variable frequency generator for generating a driving signal which is supplied to the crystal to cause the crystal to oscillate, thereby causing the surface to oscillate; and

c) an analyzer for monitoring the phase shift between the voltage across the crystal and the current flowing through it and, in response, generating an adjustment signal which relates to the difference between the oscillation frequency and a resonant frequency of the crystal, the variable frequency generator being responsive to the adjustment signal to vary the frequency of the driving signal to cause the crystal to oscillate at the resonant frequency;

wherein the variable frequency generator comprises a frequency synthesizer and additionally generates a quadrature signal that is shifted in phase by 90° from the driving signal.

22. (New) Apparatus according to claim 21, wherein the analyzer comprises two quadrature modulators, one receiving the driving signal, the quadrature signal and a signal representing the voltage across the crystal and the other receiving the driving signal, the quadrature signal and a signal representing the current flowing through the crystal.

23. (New) Apparatus according to claim 22, wherein the adjustment signal controls the operation of the frequency synthesizer, thereby changing the frequency of the driving signal.

24. (New) Apparatus according to claim 21, wherein said apparatus is configured to separate from the surface an analyte that has been immobilized on the surface.

25. (New) An apparatus for oscillating a surface, the apparatus comprising an oscillator circuit having:

a) a piezoelectric crystal connected to the surface;

b) a variable frequency generator for generating a driving signal which is supplied to the crystal to cause the crystal to oscillate, thereby causing the surface to oscillate; and,

c) an analyzer for monitoring the phase shift between the voltage across the crystal and the current flowing through it and, in response, generating an adjustment signal which relates to the difference between the oscillation frequency and a resonant frequency of the crystal, the variable frequency generator being responsive to the adjustment signal to vary the frequency of the driving signal to cause the crystal to oscillate at the resonant frequency;

wherein the variable frequency generator comprises a frequency synthesizer, and wherein the frequency synthesizer is supplied by a reference frequency from an oven controlled crystal oscillator.

26. (New) Apparatus according to claim 25, wherein said apparatus is configured to separate from the surface an analyte that has been immobilized on the surface.

27. (New) An apparatus for oscillating a surface, the apparatus comprising an oscillator circuit having:

a) a piezoelectric crystal connected to the surface;

b) a variable frequency generator for generating a driving signal which is supplied to the crystal to cause the crystal to oscillate, thereby causing the surface to oscillate; and

c) an analyzer for monitoring the phase shift between the voltage across the crystal and the current flowing through it and, in response, generating an adjustment signal which relates to the difference between the oscillation frequency and a resonant frequency of the crystal, the variable frequency generator being responsive to the adjustment signal to vary the frequency of the driving signal to cause the crystal to oscillate at the resonant frequency;

wherein the variable frequency generator comprises a frequency synthesizer, and wherein the frequency synthesizer is supplied by a reference frequency from a voltage controlled crystal oscillator.

28. (New) Apparatus according to claim 27, wherein the adjustment signal controls the frequency of oscillation of the voltage controlled crystal oscillator thereby changing the frequency of the driving signal.

29. (New) Apparatus according to claim 27, wherein the variable frequency generator additionally generates a quadrature signal that is shifted in phase by 90° from the driving signal.

30. (New) Apparatus according to claim 29, wherein the analyzer comprises two quadrature modulators, one receiving the driving signal, the quadrature signal and a signal representing the voltage across the crystal and the other receiving the driving signal, the quadrature signal and a signal representing the current flowing through the crystal.

31. (New) Apparatus according to claim 27, wherein said apparatus is configured to separate from the surface an analyte that has been immobilized on the surface.

32. (New) An apparatus for oscillating a surface, the apparatus comprising an oscillator circuit having:

a) a piezoelectric crystal connected to the surface;

b) a variable frequency generator for generating a driving signal which is supplied to the crystal to cause the crystal to oscillate, thereby causing the surface to oscillate;

c) an analyzer for monitoring the phase shift between the voltage across the crystal and the current flowing through it and, in response, generating an adjustment signal which relates to the difference between the oscillation frequency and a resonant frequency of the crystal, the variable frequency generator being responsive to the adjustment signal to vary the frequency of the driving signal to cause the crystal to oscillate at the resonant frequency; and

d) a voltage controlled amplifier for controlling the amplitude of oscillation of the crystal.

33. (New) Apparatus according to claim 32, further comprising an impedance matching network, wherein the output from the voltage controlled amplifier drives the piezoelectric crystal via said network such that the output of the voltage controlled amplifier is matched in impedance with the piezoelectric crystal.

34. (New) Apparatus according to claim 33, wherein the piezoelectric crystal is connected to a second impedance matching network.

35. (New) Apparatus according to claim 32, wherein said apparatus is configured to separate from the surface an analyte that has been immobilized on the surface.

36. (New) A method for oscillating a surface, the method comprising:

a) producing a driving signal that causes a piezoelectric crystal connected to the surface to oscillate thereby causing the surface to oscillate;

b) monitoring the phase shift between the voltage across the crystal and the current flowing through it and, in response, generating an adjustment signal which relates to the difference between the oscillation frequency and a resonant frequency of the crystal; and

c) varying the frequency of the driving signal in accordance with the adjustment signal such that the crystal oscillates at the resonant frequency;

wherein the driving signal is produced by frequency synthesis from a reference frequency, and wherein the reference frequency is temperature stabilized.

37. (New) A method for oscillating a surface, the method comprising:

a) producing a driving signal that causes a piezoelectric crystal connected to the surface to oscillate thereby causing the surface to oscillate;

b) monitoring the phase shift between the voltage across the crystal and the current flowing through it and, in response, generating an adjustment signal which relates to the difference between the oscillation frequency and a resonant frequency of the crystal; and

c) varying the frequency of the driving signal in accordance with the adjustment signal such that the crystal oscillates at the resonant frequency;

wherein the driving signal is produced by frequency synthesis from a reference frequency, and wherein the reference frequency is voltage controlled.

38. (New) A method for oscillating a surface, the method comprising:

a) producing a driving signal that causes a piezoelectric crystal connected to the surface to oscillate thereby causing the surface to oscillate;

b) monitoring the phase shift between the voltage across the crystal and the current flowing through it and, in response, generating an adjustment signal which relates to the difference between the oscillation frequency and a resonant frequency of the crystal;

c) varying the frequency of the driving signal in accordance with the adjustment signal such that the crystal oscillates at the resonant frequency; and

d) controlling the amplitude of oscillation of the crystal.

39. (New) A method according to claim 38, wherein the voltage across and current flowing through the crystal are monitored and the adjustment signal is related to the phase shift between the voltage and current.

40. (New) A method according to claim 39, wherein a quadrature signal that is in quadrature with the driving signal is also produced, the driving signal and quadrature signal both being mixed with a signal representing the voltage across the crystal and with a signal representing the current flowing through the crystal.